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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/812,986

03/31/2004

Yun-Ho Jung

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EXAMINER

SMOOT, STEPHEN W

ART UNIT

PAPER NUMBER

2813

DATE MAILED: 01/20/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/812,986

Applicant(s)

JUNG, YUN-HO

Examiner

Stephen W. Smoot

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 10 November 2005.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 7,8,11,24 and 27-32 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 7,8,11,24,27,28 and 30-32 is/are rejected.
- 7) ☒ Claim(s) 29 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 31 March 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
- 1) ☐ Certified copies of the priority documents have been received.
 - 2) ☒ Certified copies of the priority documents have been received in Application No. 10/157,201.
 - 3) ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

This Office action is in response to applicant's amendment filed on 10 November 2005.

Claim Objections

1. Claims 29-30 are objected to because of the following informalities:

In claim 29, line 2, change "sides" to --ends-- for proper antecedence to claim 28, line 1; and

In claim 30, line 2, change "sides" to --ends-- for proper antecedence to claim 28, line 1.

Appropriate correction is required.

Claim Rejections - 35 USC § 102

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

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(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

3. Claims 28, 31-32 are rejected under 35 U.S.C. 102(e) as being anticipated by Sposili et al. (US 2004/0053450 A1).

Referring to Fig. 3 and paragraphs [0030] to [0078] Sposili et al. disclose a pattern (235) corresponding to a sequential lateral solidification mask (150 in Fig. 1) with slit-shaped beamlets (255, 265) (i.e. light transmitting portions) for shaping a laser beam. The beamlets (255, 265) are 3 μm wide and are separated by corresponding shadow regions (257, 267) (i.e. light blocking portions) that are 1.5 μm wide. The opposing edges (i.e. ends) of the beamlets (255, 265) include abrupt squared interfaces between light blocking and light transmitting portions of the mask that are capable of generating interference and scattering of the laser beam. Regarding the at least one of the ends having "a shape such that an intensity of the laser beam passing through at least one end is substantially lower than an intensity of the laser beam passing through other portions due to interference and scattering" limitation of claim 28, this is an inherent property of a mask with squared light transmitting portions, since the applicant indicates in their specification at paragraph [0052] that the square-shaped edges result in a rounded exposure.

Referring now to Figs. 5A-5D, portions of a silicon thin film (52 in Fig. 1) corresponding to the beamlets (255, 265) of the mask are melted through exposure to

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the laser beam and are then crystallized to form laterally grown grains that are about 1.5 μm wide as shown in Fig. 5B. Through a subsequent exposure of the shadowed portions of the silicon thin film to the laser beam, the grains are grown wider until they bridge the 1.5 μm gap corresponding to the formerly light blocked portions (i.e. to a maximum width of about 2.25 μm).

These are all of the limitations set forth in claims 28, 31-32 of the applicant's invention.

4. Claims 28, 32 are rejected under 35 U.S.C. 102(e) as being anticipated by Voutsas et al. (US 6,573,163 B2).

Referring to Figs. 1, 2 and column 3, line 66 to column 5, line 20, Voutsas et al. (US 6,573,163 B2) disclose a mask (18) with rectangular slits (29, 31) for projecting an image from a laser source (12) onto a substrate (16) using a laser beam (14). The opposing edges of the slits (29, 31) include abrupt squared interfaces between light blocking and light transmitting portions of the mask that are capable of generating interference and scattering of the laser beam (14). Regarding the at least one of the ends having "a shape such that an intensity of the laser beam passing through at least one end is substantially lower than an intensity of the laser beam passing through other portions due to interference and scattering" limitation of claim 28, this is an inherent property of a mask with squared light transmitting portions, since the applicant indicates in their specification at paragraph [0052] that the square-shaped edges result in a rounded exposure.

Referring to Figs. 3-5, the projected image (36) corresponding to a slit is advanced across a silicon region (34) while exposing with laser pulses to form a region (40) of elongated silicon crystals (i.e. laterally grown grains) that are clearly more than 3.5 times the width of the projected image (36) as shown in Fig. 5. Even when considering the possibility that the projected image (36) may have a 7x reduction relative to the features of the mask, the width of a slit would still be less than twice the length of these elongated crystals.

These are all of the limitations set forth in claims 28, 32 of the applicant's invention.

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

6. Claims 7-8, 11, 24, 27 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sposili et al. (US 2004/0053450 A1) in view of Uchida (JP 62-026884 A – from applicant's IDS).

Referring to Fig. 3 and paragraphs [0030] to [0078] Sposili et al. disclose a pattern (235) corresponding to a sequential lateral solidification mask (150 in Fig. 1)

with slit-shaped beamlets (255, 265) (i.e. light transmitting portions) for shaping a laser beam. The beamlets (255, 265) are 3 μm wide and are separated by corresponding shadow regions (257, 267) (i.e. light blocking portions) that are 1.5 μm wide. The opposing edges (i.e. ends) of the beamlets (255, 265) include abrupt squared interfaces between light blocking and light transmitting portions of the mask that are capable of generating interference and scattering of the laser beam. Referring now to Figs. 5A-5D, portions of a silicon thin film (52 in Fig. 1) corresponding to the beamlets (255, 265) of the mask are melted through exposure to the laser beam and are then crystallized to form laterally grown grains that are about 1.5 μm wide as shown in Fig. 5B. Through a subsequent exposure of the shadowed portions of the silicon thin film to the laser beam, the grains are grown wider until they bridge the 1.5 μm gap corresponding to the formerly light blocked portions (i.e. to a maximum width of about 2.25 μm). These are limitations set forth in claims 7-8, 11, 24, 27 of the applicant's invention.

However, Sposili et al. (US 2004/0053450 A1) lack the limitation set forth in claims 7, 24 of the applicant's invention, which is a mask with stripe shaped light-transmitting portions that have either triangular shaped edges or semicircular shaped edges.

Uchida teaches a strip-shaped mask with ends that are configured to be semicircular in shape (see abstract).

Therefore it would have been obvious to a person of ordinary skill in the art at the time the invention was made to combine the teachings of Sposili et al. (US 2004/0053450 A1) and Uchida in order to round the edges of the slits taught by Sposili

et al. (US 2004/0053450 A1) into a semicircular shape as taught by Uchida. Uchida recognizes that the semicircular shape of the edges improves the optical cracking level of crystals that are exposed with a laser beam.

7. Claim 30 is rejected under 35 U.S.C. 103(a) as being unpatentable over Sposili et al. (US 2004/0053450 A1) as applied to claim 28 above, and further in view of Uchida (JP 62-026884 A – from applicant's IDS).

As shown above, Sposili et al. (US 2004/0053450 A1) anticipate claim 28 of the applicant's invention. However, Sposili et al. (US 2004/0053450 A1) lack the further limitation to claim 28 as set forth in claim 30 of the applicant's invention, which is a mask with stripe shaped light-transmitting portions that have semicircular shaped edges. Uchida teaches a strip-shaped mask with ends that are configured to be semicircular in shape (see abstract).

Therefore it would have been obvious to a person of ordinary skill in the art at the time the invention was made to combine the teachings of Sposili et al. (US 2004/0053450 A1) and Uchida in order to round the edges of the slits taught by Sposili et al. (US 2004/0053450 A1) into a semicircular shape as taught by Uchida. Uchida recognizes that the semicircular shape of the edges improves the optical cracking level of crystals that are exposed with a laser beam.

Allowable Subject Matter

8. Claim 29 would be allowable if rewritten to overcome the objection set forth in this Office action and to include all of the limitations of the base claim and any intervening claims.

9. The following is a statement of reasons for the indication of allowable subject matter: Claim 29 would be allowable because the prior art of record does not teach or suggest, in combination with the other claim limitations, a sequential lateral solidification mask that includes a plurality of stripe-shaped light transmitting portions for passing a laser beam, wherein each light transmitting portion includes triangular shaped edges on both ends.

Response to Arguments

10. Applicant's arguments filed 10 November 2005 have been fully considered but they are not persuasive.

In response to applicant's argument that Uchida (JP 62-026884 A – from applicant's IDS) is nonanalogous art, it has been held that a prior art reference must either be in the field of applicant's endeavor or, if not, then be reasonably pertinent to the particular problem with which the applicant was concerned, in order to be relied

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upon as a basis for rejection of the claimed invention. See *In re Oetiker*, 977 F.2d 1443, 24 USPQ2d 1443 (Fed. Cir. 1992). In this case, Uchida is reasonably pertinent to the particular problem with which the applicant is concerned, that is using a mask to shape a transmitted laser beam. It is also noted that the Uchida reference was cited by the applicant in their IDS filed on 31 March 2004, which is a strong indication that Uchida is analogous art.

Conclusion

11. Applicant's amendment necessitated the new grounds of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

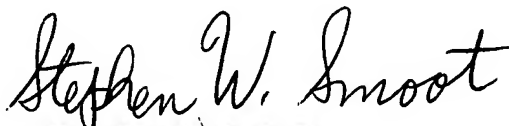
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12. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Stephen W. Smoot whose telephone number is 571-272-1698. The examiner can normally be reached on M-F (8:00 am to 4:30 pm).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Carl Whitehead, Jr. can be reached on 571-272-1702. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

SWS


STEPHEN W. SMOOT
PRIMARY EXAMINER